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On the Occurrence of Several Species of Pterostichine Ground Beetles in Virginia (Carabidae: Pterostichini)

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Most species of Southern Appalachian beetles remain very poorly known, even though the general composition of that fauna has been sketched in broad strokes for a long time. Insofar as ground beetles (carabids) are concerned there are still some undescribed taxa (some of them fairly large forms) to be accounted, and for most species our knowledge of distributional patterns is totally inadequate. These facts were enunciated by P. J. Darlington in 1931, but the challenge was not taken up for another three decades, when Thomas C. Barr began his extensive researches on the Appalachian carabid fauna. Dr. Barr's stimulating summary paper of 1969 catalyzed this writer's interest in the subject, and his personal activity with the Virginia fauna commenced on a serious basis in the early 1970s. Collecting efforts which were largely incidental to other work during the next two decades were substantially accelerated in 1989, when a long-range program to inventory the soil and litter fauna of Virginia was commenced at the Virginia Museum of Natural History. Since a number of range extensions and additions to the known fauna of the state have accumulated, it seems desirable to put them on record, and I start with accounts of several rather poorly-known species in the Pterostichini, a tribe of predominantly sylvan species of Carabidae. A contribution in this same general vein has been published recently by R. L. Davidson (1995), who added several pterostichines to the known fauna of the state.

The taxa treated here have been cited for "VA" in the 1993 list of Nearctic carabids by Bousquet & Larochelle, on the basis of data - herein formally documented - supplied to those authors. Unless otherwise specified, all material recorded below was taken by me (or by museum inventory work) and is housed in the Virginia Museum of Natural History.

1. *Gastrellarius blanchardi* (Horn)

Described from Highlands, North Carolina, this diminutive species has been recorded only as far north as the Black Mountains of that state. Unpublished records extend the known range considerably farther northward (about 152 miles/354 km), into southern West Virginia:

Virginia: *Floyd County:* Buffalo Mountain, ca. 3,000 ft/1,000 m., 23 May 1968 (T.C. Barr Colln.). *Grayson Co.:* Grayson Highlands State Park, Haw Orchard Mountain at 4800 ft/1,600 m., 8 August 1990 (2); also 30 August 1990 (1); south slope Mount Rogers, ca 4,000 ft/1334 m., 8 May 1976 (1); Whitetop Mountain, spruce forest at 5320 ft/1,775 m., 23 December 1985 (1); beech woods at 5,000 ft/1670 m., 11-31 July 1991 (2). *Tazewell Co.:* Burkes Garden, east slope Beartown Mountain at 4,000 ft/1,334 m., 27 August 1978 (1), also 17 July 1977 (1).

Washington Co.: Holston Mountain on Cty. Rt. 757, ca 1.6 km. W of Damascus, 30 April 1994 (1). *Wythe Co.*: crest of Big Walker Mountain, 3,300 ft/1,100 m., 15 June 1957 (1).

West Virginia: *Raleigh Co.*: 8 km E of Shady Spring on WV Hy. 3, 14 December 1965 (1). 10 km WSW of Sandstone, Fall Branch, New River gorge, 488 m., K. A. Buhlmann (CMNH 1). *Wyoming Co.*: Pineville, without date, Hubbard & Schwarz (USNM 2). These localities may be at or near the actual range terminus, perhaps represented by the New River gorge.

2. *Pterostichus (Cylindrocharis) acutipes kentuckensis* Barr

This species, which masqueraded for decades under the name *P. grandiceps* Chaudoir, was until recently considered to be endemic to the southern Blue Ridge. In 1969, however, Dr. Barr discovered specimens of a distinctive subspecies at several localities in central Kentucky, and formally designated this form as *P. acutipes kentuckensis* in his 1971 revision of subgenus *Cylindrocharis*. The existing gap of some 150 miles between the known ranges of the two subspecies can now be largely closed by the discovery of *acutipes* at the following sites in extreme southwestern Virginia:

Dickenson County: Breaks Interstate Park, 10 km N of Haysi, 28 August 1981 (2); 4 June 1986 (2); 30 June-17 July 1991 (1); 17 July-6 August 1991 (2); 6-22 August 1991 (1); 22 August-6 October 1991 (1); 6 October-2 November 1991 (1). *Lee County*: 1.6 km W of Olinger, 3 September 1972 (1); also Stone Creek, Straight Creek, and Jones' Creek, \pm 4.8 km NW of Pennington Gap, without date, Hubbard & Schwarz (USNM 6). *Scott County*: 1.6 km SW of Speer's Ferry along Va. Hy. 627, 3 September 1972 (1); sinkholes beside FS Rt. 776, 7.3 km W of Dungannon, 21 September 1993, S. M. Roble (1). *Wise Co.*: 5 km E of Appalachia, US Hy. 23/58, 26 June 1971 (1).

Except for the 1991 collections from the Breaks Park, all specimens were found under stones in moist wooded areas. The Breaks material is from a drift fence site in mixed oak-magnolia woods on a fairly dry east-facing slope above the Nature Trail parking lot. On the basis of Barr's key, and comparison with nominate *acutipes* from Highlands, North Carolina, these Virginia specimens are readily identified as *P. acutipes kentuckensis* Barr, 1971.

These new localities extend the known range of *kentuckensis* some 208 km eastward to the edge of the upper Tennessee Valley, which now stands as a possible barrier of some 48 km width to contact between the two

subspecies. There is no reason to doubt that *kentuckensis* will be found in southern West Virginia, less than 32 km northeast of the Breaks. However, many decades of collecting around Mount Rogers, Virginia, both by hand-picking and the use of pitfalls, have failed to reveal the occurrence of nominate *acutipes* in this state. The locality nearest to Virginia known to me is Cranberry, Avery Co., North Carolina, 51.2 km southwest of the state line at Whitetop Mountain. The known range of *acutipes* is closely paralleled by that of the primitive spider *Hypochilus pococki* Platnick, which likewise occurs in eastern Tennessee within a few kilometers of the Virginia state line at Damascus, and also in the Ridge and Valley Province in Washington and Scott counties, Va., although not yet found in the Mount Rogers area (Fig. 1).



Fig. 1. Distributional records for *Pterostichus acutipes*. The range of the nominate subspecies is outlined, with the northernmost locality (Cranberry, N.C.) indicated. Open circles in Kentucky are from Barr, 1969. Solid dots show the new localities listed in the text. x = Mt. Rogers

3. *Pterostichus (Paraferonia) lubricus* LeConte

As recently as 1969, this small denizen of streamside habitats was unknown north of the Black Mountains in North Carolina. It is actually not uncommon in parts of

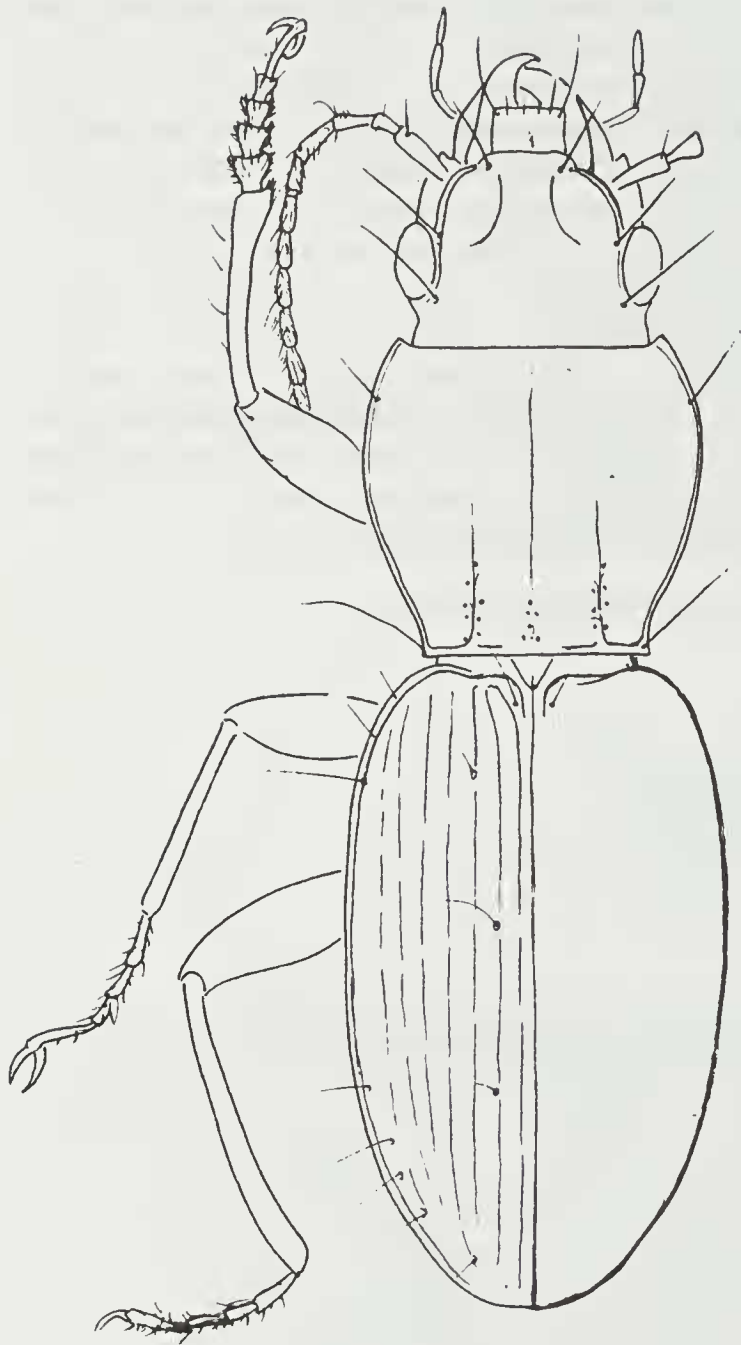


Fig. 2. *Pterostichus lubricus* Le Conte. Habitus sketch of male, dorsal aspect.

southwest Virginia, and the following localities more than double the extent of the formerly known range.

Bland Co.: Little Wolf Creek, ca 9.6 km SW of Bastian, 26 April 1980, D. W. Ogle (1). *Carroll Co.*: Cty. Rt. 620, 1.6 km E of Blue Ridge Parkway at Piper's Gap, 28 June 1984; Cty. Rt. 775, ca 3.2 km W of Fancy Gap, 2 June 1989 (1). *Floyd Co.*: beside US 221, 12 km SW of Floyd, 17 April 1974 (1); by Mile 148, Blue Ridge Parkway, ca 7.7 km SE of Check (3); end of Cty. Rt. 727, ca 7.2 km SE of Willis, 19 May 1974 (1). *Grayson Co.*: southeast side Mount Rogers, 28 Sept 1969 (1), also 8 May 1976 (1); Iron Mountain near Comer's Rock, 15 July

1972 (2); Iron Mountain, 13 km ENE of Troutdale, 7 May 1972 (1); Lewis Fork, 7.2 km W of Troutdale on Cty. Rt. 603, 27 June 1974 (1). *Montgomery Co.*: beside Cty. Rt. 672, 5 km SSE of Childress, 12 August 1985 (2). *Patrick Co.*: Pinnacles of Dan, below Townes Dam, 22 April 1972 (1). *Pulaski Co.*: ca 3.2 km W Snowville, Cty. Rt. 605, 6 June 1981 (1); along Mack's Creek, Powhatan Boy Scout Reservation, ca 13 km SE of Pulaski, 2 August 1985 (2). *Tazewell Co.*: Burkes Garden, east slope Beartown Mountain, 14 May 1977 (1), also 28 August 1977 (2).

In virtually all of the places where I have found this species, it occurred along the sides of small (< 1 meter wide), low-gradient streams in company with *Bembidion nigrum*, *Agonum extensicolle*, and *Nebria pallipes*. Most frequently, specimens were found within small mats of dead leaves piled up during periods of high water, rather than under stones. Almost invariably, collection sites were ravines shaded by Canada hemlock (*Tsuga canadensis*) with understory of rosebay rhododendron (*Rhododendron maximum*). Conditions for this general kind of biotope exist most frequently in three Virginia counties (Floyd, Carroll, and Grayson) associated with the Southern Section of the Blue Ridge, a region in which low-gradient drainage is typical, in contrast to the steeper and swifter streamlets of the Ridge & Valley Province to the west. It seems likely that the range of *lubricus* in Virginia does not extend much farther northeast than presently known, with the Roanoke River

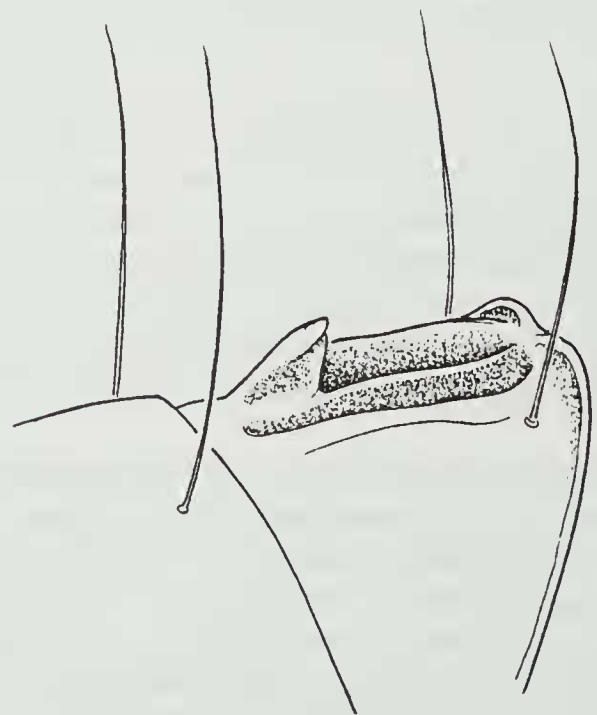


Fig. 3. *Pterostichus lubricus*. Last sternite of male, oblique lateral view, showing modification typical of this species.

valley and diminution of the Blue Ridge acting as coincident barriers. But the situation to the north and west is uncertain and it is not impossible that the species enters West Virginia in the Bluefield-Athens area (paralleling the case of *Gastrellarius blanchardi*).

On 2 August 1985 several males and a female were captured at the Powhatan Scout Reservation site and returned alive to the lab. An attempt to induce mating was unsuccessful: when a pair was brought together the male immediately attacked the female and seized her by a leg. Although they were separated at once, apparently some trauma was inflicted as the female died the following day.

So far as I know, this species has never been illustrated so I provide here a habitus sketch (Fig. 2) as well as an enlarged representation of the modified male ultimate sternum. This has the form of a shallow median depression bisected by a low thin ridge which is abruptly enlarged anteriorly into a subconic-triangular projection, large enough to be visible without magnification (Fig. 3).

The specimen illustrated has only three elytral setae (four is the typical number), of which the anteriormost is located in the 3rd stria, the other two in the second. The elytra present a characteristic "oily" sheen, which no doubt led LeConte to his choice of the species name.

4. *Pterostichus (Argutor) patruelis* (Dejean)

This boreal species is transcontinental in Canada and the northern tier of states, extending southward as far as Pennsylvania and West Virginia. Two collections of *patruelis* made in western Virginia establish the species still farther south, and leave little doubt that it will be discovered in the high mountains of North Carolina and Tennessee, as the Whitetop locality is only 5.6 km from the point shared in common by the boundaries of these three states.

Tazewell Co.: Burkes Garden, shoreline of Gose Millpond, at 3,000 ft/1,000 m. 21 May 1978 (1), det. Y. Bousquet. *Grayson Co.*: Whitetop Mountain, beside rivulet crossing Forest Service Rt. 89 at 4,800 ft/1600 m. 14 May 1978 (1).

The two collection sites could hardly be more dissimilar, water being the only common denominator. The Whitetop specimen was taken in leaf litter beside a swift cascading rocky brook in mixed spruce-northern hardwoods forest. That from Burkes Garden was found at the muddy edge of an alder-fringed pond in company with *Bembidion graciliforme* Hayward, during "splashing" activity.

5. *Pterostichus (Bothriopterus) pensylvanicus* LeConte

This widespread boreal carabid has been recorded for eastern North America as far south as Pennsylvania (Bousquet & Laroche 1993: 169). It is now possible to extend the known range still farther southward through the Appalachians into westernmost Virginia:

Augusta Co. Shenandoah Mountain, ca 8.2 km SW of Reddish Knob on FS 85, 28 May 1988, Kurt A. Buhlmann (1); Shenandoah Mountain, 3,500 ft/1,180 m., ca 13 km NW of Stokesville, 22 May 1977 (1). *Highland Co.* Locust Springs Recreation Area, ca 13 km NW of Hightown, 28 August 1972 (1); Sounding Knob, 4,000 ft/1,330 m, 7.2 km S of Monterey, 17 August 1974 (1). *Rockingham Co.* Shenandoah Mountain, at jct FS 86 and Cty. 924, 17 June 1988, K. A. Buhlmann (4).

The specimen from Sounding Knob appears to be the southernmost known for this species, but I have little doubt that *pensylvanicus* will be found still farther down into Bath and perhaps Alleghany counties.

This material was the basis for inclusion of Virginia in the range of *P. adstrictus* Eschscholtz by Bousquet & Laroche (1993: 170). Mr. Davidson noted the misidentification while examining carabid material at VMNH.

6. *Pterostichus (Bothriopterus) adstrictus* Eschscholtz

As noted in the preceding entry, Virginia must be removed from the list of states of its known occurrence. So far as known to me, there are no verified records for *adstrictus* south of Pennsylvania.

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I am very much in the debt of R. L. Davidson and Y. Bousquet for identifications and confirmation of several species; Mr. Davidson also provided manuscript review and contributed a West Virginia record for *Pterostichus blanchardi* from material in the Carnegie Museum (CMNH). T. L. Erwin granted access to the USNM carabid collections on several occasions.

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Shorter Contributions

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FIRST RECORD OF A SHREW OF THE GENUS *SOREX* ON THE EASTERN SHORE OF VIRGINIA—Three species of long-tailed shrews (*Sorex cinereus*, *S. longirostris*, and *S. hoyi*) are documented from the Coastal Plain of Virginia and/or Maryland (Hall, 1981; Paradiso, 1969; Webster et al., 1985). However, the published distributions of these species have not included Accomack and Northampton counties, which comprise the Virginia portion of the Delmarva Peninsula, also known as the Eastern Shore of Virginia. Two other shrews (*Cryptotis parva* and *Blarina brevicauda*) occur throughout the Delmarva Peninsula, including the Virginia portion (Bailey, 1946; Handley & Patton, 1947; Hall, 1981; Webster et al., 1985). Two species of *Sorex* (*S. cinereus* and *S. fontinalis*) are reported from Delaware (Ken Reynolds, in litt.), and two (*S. cinereus* and *S. hoyi*) occur on the Eastern Shore of Maryland (Paradiso, 1969). Paradiso's (1969) accounts include one specimen of *S. cinereus* from Dorchester County, Maryland, which is near the middle portion of Maryland's Eastern Shore, as well as a specimen recovered from an owl pellet in Worcester County, Maryland, which is adjacent to Accomack County, Virginia.

As part of an investigation of mammal distributions on the Virginia barrier islands and adjacent Delmarva peninsula, we surveyed approximately 100 North American collections of Recent mammals for their holdings from Accomack and Northampton counties, Virginia. This survey revealed a skin-plus-skeleton specimen of *Sorex cinereus* collected 30 December 1950, at Locustville, Accomack County, Virginia by H. B. Quay. This specimen is housed at the Museum of Vertebrate Zoology, University of California at Berkeley, MVZ # 136676.

Examination of this specimen and comparison with representatives of *S. c. cinereus* (University of North Carolina, Wilmington # 1585, 4968) and *S. c. fontinalis*

(United States National Museum # 290876) confirm that it is referable to *S. c. fontinalis*. Copies of Quay's field notes are not available (C. Cicero, in litt.), therefore the exact location of capture and the type of habitat in which this specimen occurred are unknown. Paradiso (1969:18) describes the habitat of this subspecies as "mixed deciduous woods.... [and] ...a dense tangle of sumac and honeysuckle bordering a marsh... [as well as] ...similar habitat along a small stream...."

This specimen confirms the historical occurrence of *S. c. fontinalis* in Virginia, and provides evidence that Handley (1982) lacked when he stated that "*S. c. fontinalis* is not known to occur in Virginia." Efforts to determine whether this taxon continues to exist in Accomack County are underway.

Acknowledgments

We thank W. David Webster, University of North Carolina, Wilmington for corroborating our identification of this specimen and for allowing us to examine specimens in his collection and those on loan to him from the National Museum of Natural History. We also thank Barbara Stein, MVZ, for loaning specimens in her care to NDM.

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